PATENT ABSTRACTS OF JAPAN

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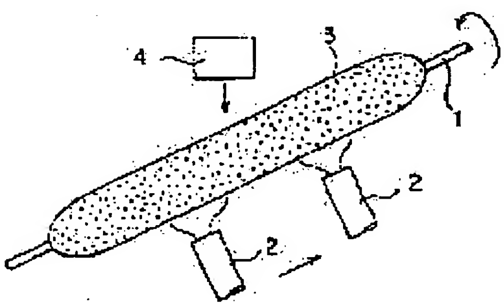
(54) PRODUCTION OF GLASS PREFORM FOR OPTICAL FIBER



(57)Abstract:
PROBLEM TO BE SOLVED: To suppress the fluctuation in the outside diameter in the longitudinal direction of a glass preform for an optical fiber by controlling the traversing speed of a burner by a specific method in the production of the glass preform by an external deposition method.
SOLUTION: While a bar-shaped starting material 1 is rotated around its axis, the burner 2 for forming soot is traversed along the axial direction of the starting member 1, thereby the soot 3 is deposited on the outer periphery of the starting member 1. At this time, the traversing speed of the burner 2 is gradually decreased with an increase in the amt. of the deposited soot. The increase of the soot amt. is checked by its weight change or diameter change.

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CLAIMS

[Claim(s)]
[Claim 1] The manufacture approach of the glass base material for optical fibers characterized by slowing down as the amount of soots which deposits the traverse rate of said burner increases in the manufacture approach of the glass base material for optical fibers of making the burner for soot generation traversing in accordance with the shaft orientations of said start member, and making a soot depositing on the periphery of said start member, rotating a rod-like start member around the shaft.
[Claim 2] The manufacture approach of the glass base material for optical fibers according to claim 1 characterized by checking the increment in the amount of soots by the weight change.
[Claim 3] The manufacture approach of the glass base material for optical fibers according to claim 1 characterized by checking the increment in the amount of soots by the path change.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention offers the approach of controlling the outer-diameter fluctuation under soot deposition about the manufacture approach of the glass base material for optical fibers by the so-called outside vapor phase deposition method.
[0002]
[Description of the Prior Art] The outside vapor phase deposition method is well known as the production approach of the glass base material for optical fibers. This approach is an approach of making the soot which was made traversing the burner 2 for soot generation in accordance with the shaft orientations of the start member 1, and was generated depositing on the periphery of the start member 1 as a soot layer 3, rotating the rod-like start member 1 around that shaft, as shown in drawing 2 . In addition, supply of the material gas to a burner 2, oxygen, hydrogen, etc. is performed at the time of the outward trip which goes to a right end from the left end of the start member 1, and the burner 2 for soot generation stops at the time of a return trip, although it does not restrict

with one, but two or more are prepared and a sequential traverse is usually carried out in consideration of the deposition effectiveness. And although the outward trip of the traverse rate is made into a predetermined rate, since a return trip does not have gas supply, it is returned to the original location at high speed. moreover, the material gas supplied to a burner 2 -- typical -- SiCl4 it is -- the start members 1 are GeO2-SiO2 glass rod and SiO2 glass rod typically.

[0003]

[Problem(s) to be Solved by the Invention] By the way, if there is outer-diameter fluctuation in the die-length direction of the optical fiber preform obtained by this approach, since a bad influence is in properties, such as cut-off wavelength and transmission loss, it is necessary to reduce outer-diameter fluctuation as much as possible. And it is easy to produce this outer-diameter fluctuation in the small phase of the diameter of a base material in early stages of optical fiber preform production. In order to suppress outer-diameter fluctuation, it is known that what is necessary is just to traverse speed up [of the burner at the time of soot deposition], but there is long duration or a problem of cutting until it will reach a predetermined path since the time amount which a soot deposits decreases relatively and the deposition effectiveness of a soot falls if it speeds up [traverse].

[0004]

[Means for Solving the Problem] Invention according to claim 1 by which this invention is a thing aiming at solution of the above problem, and it is characterized [that] In the manufacture approach of the glass base material for optical fibers of making the burner for soot generation traversing in accordance with the shaft orientations of said start member, and making a soot depositing on the periphery of said start member, rotating a rod-like start member around the shaft It is in the manufacture approach of the glass base material for optical fibers slowed down as the amount of soots which deposits the traverse rate of said burner increases. Moreover, in invention according to claim 1, checking the increment in the amount of soots by the weight change has invention according to claim 2 by which it is characterized [the]. Furthermore, in invention according to claim 1, checking the increment in the amount of soots by the path change has invention according to claim 3 by which it is characterized [the].

[0005]

[Embodiment of the Invention] Drawing 1 shows the outside vapor phase deposition method by this invention approach. In drawing, the same sign is attached about the same part as drawing 2 . In addition, the diameter of a soot is measured, the result of the change is transmitted to the traversing mechanism of a burner, although not illustrated, and 4 is an outer-diameter measuring instrument and it is made as [slow / the traverse rate of a burner]. In addition, it changes into measurement of the diameter of a soot, the deposition weight of a soot is measured, and you may make it slow down the traverse rate of a burner based on the increase-in-quantity change.

[0006]

[Example]

It is 40rpm to the surroundings of the shaft about an example 1 quartz system rod. Making it rotate, two burners were made to traverse in accordance with the shaft, and SiO2 soot was made to deposit on the periphery of a quartz system rod in the shape of a layer. In addition, material gas SiCl4 to each burner And H2 and O2 The amount of

supply was set to 4SLM(s), 40 SLM, and 18 SLM, respectively. And during deposition of a soot, as it acted as the monitor of the deposition weight continuously and it was shown in Table 1, the traverse rate of a burner was changed to change of a three-stage. In addition, target soot weight is shown by the inside W of Table 1. When transparence vitrification of the obtained SiO2 soot layer was carried out at 1500 degrees C and outer-diameter fluctuation of the die-length direction was investigated, it was ** 0.5%, and as compared with the former being **1%, it was good.

[0007]

[Table 1]

スート重量（g）	トラバース速度（mm/min）
$0 \sim \frac{W}{2}$	440
$\frac{W}{2} \sim \frac{3W}{4}$	220
$\frac{3W}{4} \sim W$	55

[0008] It is 40rpm to the surroundings of the shaft about an example 2 quartz system rod. Making it rotate, two burners were made to traverse in accordance with the shaft, and SiO2 soot was made to deposit on the periphery of a quartz rod in the shape of a layer. In addition, material gas SiCl4 to each burner And H2 and O2 The amount of supply was set to 4SLM(s), 40 SLM, and 18 SLM, respectively. And during deposition of a soot, as it acted as the monitor of the deposition weight continuously and it was shown in Table 2, the traverse rate of a burner was changed to change of a three-stage. In addition, the diameter of the rha rod in Table 2 and R show the diameter of a soot. When transparence vitrification of the obtained SiO2 soot layer was carried out at 1500 degrees C and outer-diameter fluctuation of the die-length direction was investigated, it was as good as ** 0.5%.

[0009]

[Table 2]

スート外径（mm）	トラバース速度（mm/min）
$r \sim \frac{R}{2}$	440
$\frac{R}{2} \sim \frac{3R}{4}$	220
$\frac{3R}{4} \sim R$	55

[0010] Although the example which slows down the traverse rate of a burner to a three-stage to deposition change of a soot was shown, the number may increase a count more in addition to a three-stage, and you may make it dwindle it gradually in the above-mentioned examples 1 and 2.

[0011]
[Effect of the Invention] Since it slowed down the traverse rate of a soot generation burner as the amount of soots of this invention approach faced and deposited on producing the glass base material for optical fibers with an outside vapor phase deposition method increased, it does so the effectiveness that outer-diameter fluctuation of the base material obtained is controlled.

TECHNICAL FIELD

[Field of the Invention] This invention offers the approach of controlling the outer-diameter fluctuation under soot deposition about the manufacture approach of the glass base material for optical fibers by the so-called outside vapor phase deposition method.

PRIOR ART

[Description of the Prior Art] The outside vapor phase deposition method is well known as the production approach of the glass base material for optical fibers. This approach is an approach of making the soot which was made traversing the burner 2 for soot generation in accordance with the shaft orientations of the start member 1, and was generated depositing on the periphery of the start member 1 as a soot layer 3, rotating the rod-like start member 1 around that shaft, as shown in <u>drawing 2</u> . In addition, supply of the material gas to a burner 2, oxygen, hydrogen, etc. is performed at the time of the outward trip which goes to a right end from the left end of the start member 1, and the burner 2 for soot generation stops at the time of a return trip, although it does not restrict with one, but two or more are prepared and a sequential traverse is usually carried out in consideration of the deposition effectiveness. And although the outward trip of the traverse rate is made into a predetermined rate, since a return trip does not have gas supply, it is returned to the original location at high speed. moreover, the material gas supplied to a burner 2 -- typical -- $SiCl_4$ it is -- the start members 1 are GeO_2-SiO_2 glass rod and SiO_2 glass rod typically.

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TECHNICAL PROBLEM

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MEANS

[Means for Solving the Problem] Invention according to claim 1 by which this invention is a thing aiming at solution of the above problem, and it is characterized [that] In the manufacture approach of the glass base material for optical fibers of making the burner for soot generation traversing in accordance with the shaft orientations of said start member, and making a soot depositing on the periphery of said start member, rotating a rod-like start member around the shaft It is in the manufacture approach of the glass base material for optical fibers slowed down as the amount of soots which deposits the traverse rate of said burner increases. Moreover, in invention according to claim 1, checking the increment in the amount of soots by the weight change has invention according to claim 2 by which it is characterized [the]. Furthermore, in invention according to claim 1, checking the increment in the amount of soots by the path change has invention according to claim 3 by which it is characterized [the].
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EXAMPLE

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[0007]

[Table 1]

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[0009]
[Table 2]

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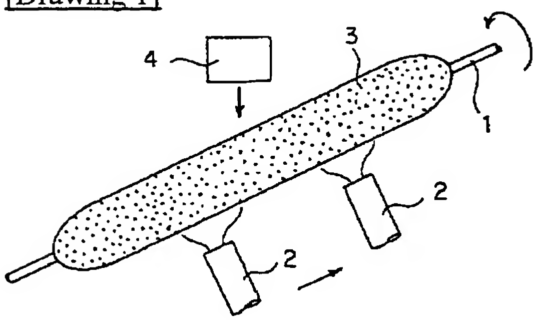
DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The approximate account Fig. of an outside vapor phase deposition method showing this invention approach.
[Drawing 2] The approximate account Fig. of a typical outside vapor phase deposition method.

[Description of Notations]
1 Start Member
2 Soot Generation Burner
3 Soot Layer
4 Outer-Diameter Measuring Instrument

DRAWINGS

[Drawing 1]



[Drawing 2]